

**CONCEPT**

Existing weather conditions, such as atmosphere, stability, wind, air temperature, and relative humidity, all contribute to fire behavior.

OBJECTIVE

Students will be able to:

- identify the effects of wind on fuel moisture levels
- identify current air temperature, relative humidity and cloud types
- explain the difference between stable vs. unstable air
- describe the conditions for fire risk

METHOD

Have students work in groups to read through their hand-out, conduct the lab, and answer the questions on their investigation worksheets.

Fire Behavior & Weather

Procedure

1. Ask students to read the *Fire Behavior & Weather* handout.
2. Discuss the weather conditions that contribute to fire behavior.

Dry Air/Transpiration Lab

This lab is designed to demonstrate how dry, Santa Ana winds and a drop in relative humidity are significant contributors to decreasing plant fuel moisture levels. Transpiration will be measured using a *potometer* (*pot*=to drink, *meter*=measure).

1. Discuss transpiration with the students, explaining that it is the evaporation of water through the stomates of a plant leaf.

You may want to have the following procedures done ahead of time and set up as a demonstration for the students.

- Place the tip of a 0.1 ml pipette into a 16" piece of clear plastic tubing.
 - Submerge the tubing and pipette in a shallow tray of water. Draw water through the tubing until all air bubbles are eliminated.
 - Carefully cut the plant stem UNDER WATER.
 - While the plant is submerged, insert the freshly cut stem into the open end of the tubing.
 - Bend the tubing upward into a "U" and use the clamp on a ring stand to hold both pipette and tubing.
 - Use petroleum jelly to make an airtight seal surrounding the stem AFTER it has been inserted into the tube. Make sure the end of the stem is immersed in water.
 - Let the potometer apparatus equilibrate for 10 minutes before beginning the demonstration.
2. Measure relative humidity as close to the plant as possible.
 3. Record the results on *7a-Student Investigation Worksheet*.
 4. Expose the plant to the wind of a fan, at least 1 meter from the plant on low speed.
 5. Read and record the level of water in the pipette at the beginning (time zero).
 6. Continue to record the water level in the pipette every 3 minutes for 30 minutes. (You may wish to assign this to a student, while performing the next Lab.)



Fire Behavior & Weather

MATERIALS

- Student Handout
- Student Investigation Worksheets
- 0.1 ml pipette
- Ring stand
- Clamps
- Clear plastic tubing
- Petroleum jelly
- Electric fan
- plant cutting (as freshly cut as possible): about 1' long, diameter should fit tightly inside the tubing
- See GLOBE protocols for the Atmosphere Investigation

DURATION

2 – 3 class sessions

7. At the end of 30 minutes, retake the relative humidity.
8. Have students record the data on *7a–Student Investigation Worksheet* and complete the questions.
9. Have students present their answers.
10. Discuss the answers with the students.

GLOBE Atmosphere Investigation

1. Divide the class into small groups and hand out materials to follow GLOBE protocols under the *GLOBE Atmosphere Investigation* including cloud type, rainfall, current temperature, and relative humidity.
2. Have students complete all the questions on the *7a–Student Investigation Worksheet*.
3. Have students present their answers.
4. Discuss the answers with the students.

Video Connections

- Fire Weather, Part 1
- GLOBE – Atmosphere

Extensions

Visit www.Globe.gov/ for additional related activities under the GLOBE Teacher's Guide.

Key Words

Atmospheric
Dust Devil
Stratus

Climate
Protocol
Water Vapor

Cumulus
Relative Humidity
Weather